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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,877	05/12/2005	Armin Schwerdtner	013150-012	6555

20802 7590 10/31/2006

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EXAMINER	
CHANG, AUDREY Y	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 10/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/534,877	SCHWERDTNER, ARMIN	
	Examiner	Art Unit	
	Audrey Y. Chang	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 May 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's preliminary amendment filed on May 12, 2005 which has been entered into the file.
- By this amendment, the applicant has amended claims 1-10.
- Claims 1-10 remain pending in this application.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. **Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading.** If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, **the "virtual point light source", 'line light source", "opening per cell", "movable mirror", "another suitable way", and "position sensor", recited in the claims,** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. **Claims 1-10 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The specification and the claims fail to teach how does the "virtual point light source" be provided.

The specification and the claims fail to teach how could the video hologram be reconstructed by "Fourier transformation"? How does the Fourier transformation be carried out? The specification actually discloses "inverse Fourier transformation" of the light source as it illuminates the hologram, (please see Figure 1 and paragraph [0014]).

Claim Objections

4. Claims 1-10 are objected to because of the following informalities

(1). The phrase "video hologram and device for reconstructing video holograms" recited in claim 1, is confusing and indefinite since it is not clear if this claim is referred to the video hologram or *a device for reconstructing* the video hologram. This phrase is better stated as "a device for reconstructing a video hologram". Also what is considered to be "video hologram"? At this juncture it is being interpreted as *hologram recording of video information.*

(2). The phrase "virtual point light" recited in claim 1 is confusing since it is not clear where does this virtual point source come from.

(3). The phrase "sufficiently" recited in claim 1 that is indefinite.

(4). The phrase "in an otherwise regular pattern" recited in claims 1 and 9 that is indefinite since it is not clear what is considered to be this "otherwise regular pattern".

(5). The phrase "at least one opening per cell" that is confusing and indefinite since it is not clear what is considered to be this opening.

(6). The phrase "the reconstruction by the Fourier transform of the video hologram" recited in the claim 1, that is confusing and indefinite since it is not clear what is considered to be "reconstruction by the Fourier transform". It is not clear if this means the hologram is a Fourier hologram or not?

(7). The phrase "approximately limited positioned in relation to one eye, an eye distance or a viewer or to another suitable area" recited in claim 2 is confusing and indefinite since firstly the term "approximately" is indefinite. Secondly the alternative phrase "one eye, an eye distance or a viewer or to another suitable area" makes the scope very unclear.

(8). The phrase "suitable position" recited in claim 3 is confusing and indefinite since there is no definite limitation to define "suitable". It is not clear if "the viewer" is also part of the device as recited in claim 3.

(9). The phrase "can be" recited in claims 5-7 is confusing and indefinite since it is not clear the phrases after "can be" are or are not part of the claims. The recitation that an element is "capable of" performing a function is not a positive limitations constitute a limitations in any patentable sense. In re Hutchison, 69 USPQ 138.

(10). The phrase "by movable mirror or in anther suitable way" recited in claim 7 is confusing and indefinite since it is not clear how does the movable mirror relate to other elements in the claim and also it is not clear what is considered to be "another suitable way".

(11). The phrase "the hologram-bearing medium can be re-encoded for second eye synchronously to turning on" recited in claim 5 is confusing and indefinite since it is not clear what is this "re-encoded".

(12). The phrase "and/or" recited in claim 9 is confusing and indefinite.

The claim language at this juncture is narrative and full of indefinite and confusing descriptions. The applicant is respectfully requested to correct ALL the discrepancies and indefiniteness to make the claims in comply with the requirements of 35 USC 112, first and second paragraphs. Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 2, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Payne et al (PN. 7,053,925).

Payne et al teach a *three-dimensional display* that comprises a *hologram reconstructing device,* wherein the display comprises a *computer generated hologram* (1, 20 or 30, CGH Figures 1-3) that is displayed in a *liquid crystal display or spatial light modulator* (please see column 7, lines 32-43), which implicitly includes real light source for illumination, (please see the reconstructed light generated and emitted from the CGH as shown in Figures 1-3) and a *lens* (2, 21 or 31) for generating a *three-dimensional scene* (3, Figures 1-3) at the *Fourier transformation plane* (22, please see column 8, line 63 column 9, line 11 that the three dimensional image is seen in the volume 23 at and near the Fourier transformation plane 22), which therefore "*reconstructs the hologram by the Fourier transformation*". The display further provides a viewing plane at the location of an observer, (please see the eye position as shown in Figures 1-3). Payne teaches that the computer generated hologram comprises a plurality of *pixels* (27, which arranged in matrix form as in ordinary liquid crystal display or spatial light modulator)

or *contributing regions* (5, Figure 1) that serve as the cells and the each pixel or contributing region (such as 27 as in Figure 2) has a limited angular cone of image light (28) that reaches the eye pupil (24) which defines a viewing widow for the eye, (please see column 7-9).

This reference has met all the limitations of the claims. It however does not teach explicitly about that each cells or pixels has at least one opening and the phase and amplitude of said opening being controllable. However, such features are considered to be implicitly included in the display. Since the computer generated hologram is displayed on a liquid crystal display or a spatial light modulator which presents the computer generated hologram by switching the pixels ON or OFF which means the phase and the amplitude of the hologram can be controlled by the tuning of the pixels. Furthermore, Payne et al teaches that the sub-regions within the contributing region are controlled by a control means to produce complete image for at least one determined viewing position, (please see column 3, lines 58-61).

This reference also does not teach explicitly that the viewing window is located periodically with a periodicity interval and the extension of the viewing widow is not greater than the periodicity interval. However, the reconstruction of the computer generated hologram is based on diffraction principle which means there are higher orders of diffraction light resulted from the reconstruction process which corresponds to different viewing location or pupil positions. Payne et al teach that only a limited angular cone of image light (28, Figure 2) reaches the pupil of the eye this means the extend of the viewing window is implicitly not greater than the periodicity interval or it would have been obvious to one skilled in the art to modify such so that no cross talk of the image viewing is resulted to avoid noise.

With regard to claim 2, Payne et al teaches that the viewing window is limited positioned in relate to the pupil of the observer's eye, (please see Figures 1-3).

With regard to claims 7-8, Payne et al teaches that a eye monitoring means (9, Figure 1) that serves as the position sensor senses the position of the observer and sends a message to the controlling means to control the contributing region (5) to provide effective pupil according to the sensed location of

the observer, (please see Figure 1, column 7, line 56 to column 8, lines 10). The contributing region (5) is essentially controlled by illumination of the liquid crystal display device, this means the light source responsible the illumination is "moved in another suitable way".

7. Claims 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Payne et al as applied to claim 1 above, and further in view of the patent issued to Klug et al (PN. 6,665,100).

The three dimensional display with computer generated hologram taught by Payne et al as described for claim 1 above has met all the limitations of the claims. Payne et al teaches that the computer generated hologram has multiple contributing regions that provide image light to viewer's two different eyes or to additional eyes of multiple viewers, (please se column 7, lines 25-30). It is implicitly true that different viewer's eyes and different eyes for multiple viewers are considered to be different viewing window. In order to provide the multiple contributing regions, different light illumination pattern is required. This reference however does not teach *explicitly* to include a second light source for providing the illumination. Klug et al in the same field of endeavor teaches that it is possible to provide autostereoscopic view by using different projectors (i.e. different light sources, Figure 4) to reconstructed the hologram to provide different view zone for each of the projector. It would then have been obvious to one skilled in the art to apply the teachings of Klug et al to modify the display of Payne et al to use different light source to activate and reconstructs the "contributing regions" to provide a second viewing window for the second eye of the observer to achieve the three dimensional viewing.

With regard to claim 4, it is implicitly true that the higher order diffraction for the first viewing window for the first eye would have an intensity minimum at the second viewing window to reduce the possible cross talk.

With regard to claim 5, it is implicitly true that in order to provide three dimensional viewing the switching of the first and second viewing widow have to be synchronous.

With regard to claim 6, both Payne et al and Klug et al teaches multiple contribution regions or multiple light sources are turned on for multiple viewers, (please see column 7, lines 25-30 of Payne et al and Figure 4 of Klug et al).

8. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Payne et al as applied to claim 1 above, and further in view of the patent issued to Gutjahr (PN. 6,462,869).

The three dimensional display with computer generated hologram taught by Payne et al as described for claim 1 above has met all the limitations of the claims.

With regard to claims 9-10, Payne et al does not teach explicitly concerning the color reconstruction. **Gutjahr** in the same field of endeavor teaches a color large surface images wherein three primary color projectors (22, 24, 26 Figure 3) is used to illuminate and reconstruct hologram (10, Figure 3) to provide the full color display. It would then have been obvious to one skilled in the art to apply the teachings of Gutjahr to modify the three dimensional display of Payne to make it a full color display. It is implicitly true that since holographic element is wavelength selective, different holographic elements (i.e. different openings) are needed for reconstructing different color image components.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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